

Fact Sheet
September, 2002

G.M. Powertrain - Bedford
Central Foundry Division
105 GM Drive
Bedford, Indiana 47421-0271
Lawrence County

Introduction

G. M. Powertrain - Bedford has applied for the renewal of National Pollutant Discharge Elimination System (NPDES) Permit No. IN0003573. This permit regulates the discharge of process wastewater and storm water from Outfall 002 and storm water from Outfall 003 at the permittee's Bedford, Indiana facility to a water of the state. A five (5) year permit is proposed in accordance with 327 IAC 5-2-6(a).

Facility Description

G. M. Powertrain - Bedford is classified under Standard Industrial Classification (SIC) Code 3361 - Aluminum Foundries (Castings). The facility manufactures automobile transmission casings, pistons, intake manifolds, and engine blocks utilizing aluminum die castings and permanent molding processes. The facility has approximately 1,000 employees working three (3) shifts 5 -7 days per week.

Wastewater Sources and Treatment

The facilities intake water source is the City of Bedford's Public Water Supply (PWS) which is used as process and sanitary water. Storm water is collected and recycled as make-up water for process operations. The wastewater discharge at this facility from Outfall 002 consists of contact and non-contact cooling water, treated corrective action waste streams, and storm water. The discharge at Outfall 003 consists entirely of storm water run-off and is intermittent.

The facilities wastewater treatment plant (WWTP) treats and recycles the waters used in the manufacturing processes, corrective action waste streams and utilizes surface run-off collected in a storm water lagoon for make-up to the recycled water loop. The contact and non contact cooling water from the production areas along with some surface drainage flow by gravity to the WWTP.

The wastewater treatment system has an average discharge of approximately 0.25 MGD and has been given a Class D industrial wastewater treatment plant classification in accordance with 327 IAC 8-12-2.

A water flow schematic is appended as Attachment I.

Receiving Stream

The $Q_{7,10}$ low flow value of the unnamed tributary to the Bailey Branch of Pleasant Run Creek is 0.0 cfs and shall be capable of supporting a well-balanced warm water aquatic community and full body contact recreation in accordance with 327 IAC 2-1-3.

A map showing the location of the facility is appended as Attachment II.

Previous Permit

Pollutants of concern and their discharge limits at **Outfall 002**.

DISCHARGE LIMITATIONS

<u>Parameter</u>	<u>Quantity or Loading</u>			<u>Quality or Concentration</u>			<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Report	Report	MGD	-	-	-	5 x Weekly	24 Hour Total
pH	-	6.0 to 9.0	Std Units	-	-	-	1 x Weekly	Grab
Oil & Grease	-	-	-	-	10	mg/l	1 x Weekly	Grab
Total Suspended Solids	-	-	-	10	15	mg/l	1 x Weekly	24 Hr. Composite
Total Copper	-	-	-	-	0.14	mg/l	1 x Weekly	24 Hr. Composite
Total Lead	-	-	-	-	0.2	mg/l	1 x Weekly	24 Hr. Composite
Total Zinc	0.61	1.62	lbs/day	-	-	-	1 x Weekly	24 Hr. Composite
Total Phenols	0.27	0.76	lbs/day	-	-	-	3 x Weekly	24 Hr. Composite
Total Residual Chlorine	-	-	-	-	0.2	-	1 x Weekly	Grab
Polychlorinated Biphenyls (PCB's)	-	-	-	-	0.001	mg/l	1 x Monthly	24 Hr. Composite
Ammonia	-	-	-	1.8	3.6	mg/l	1 x Weekly	24 Hr. Composite
BOD ₅	-	-	-	15	30	mg/l	3 x Weekly	24 Hr. Composite
Total Toxic Organics	-	-	-	-	-	-	Semi-annually	-

Pollutants of concern and their discharge limits at **Outfall 003**.

DISCHARGE LIMITATIONS

<u>Parameter</u>	<u>Quantity or Loading</u>			<u>Quality or Concentration</u>			<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	-	-	MGD	-	-	-	Measure when sampling	
pH	-	6.0 to 9.0	Std Units	-	-	-	1 x Weekly	Grab
Oil & Grease	-	-	-	-	-	-	1 x Weekly	Grab
PCB's	-	-	-	-	-	-	Daily	24 Hr. Composite

Renewal PermitPollutants of concern and discharge limits at **Outfall 002**.DISCHARGE LIMITATIONS [1]

<u>Parameter</u>	<u>Quantity or Loading</u>			<u>Quality or Concentration</u>			<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Report	Report	MGD	-	-	-	5 x Weekly	24 Hour Total
pH	-	6.0 to 9.0	Std Units	-	-	-	1 x Weekly	Grab
Oil & Grease	-	-	-	-	10	mg/l	1 x Weekly	Grab
Total Suspended Solids	-	-	-	10	15	mg/l	1 x Weekly	24 Hr. Composite
Total Copper [2]	-	-	-	0.023	0.054	mg/l	1 x Weekly	24 Hr. Composite
Total Lead [2]	-	-	-	0.01	0.02	mg/l	1 x Weekly	24 Hr. Composite
Total Zinc [2]	0.54	1.41	lbs/day	-	-	-	1 x Weekly	24 Hr. Composite
Total Phenols	0.27	0.76	lbs/day	-	-	-	1 x Weekly	24 Hr. Composite
Total Residual Chlorine[3]	-	-	-	0.01	0.02	mg/l	1 x Weekly	Grab
Polychlorinated Biphenyls (PCB's) [3]	-	-	-	0.0006	0.0013	ug/l	1 x Weekly	24 Hr. Composite
Ammonia	-	-	-	1.8	3.6	mg/l	1 x Weekly	24 Hr. Composite
BOD ₅ [4]								
Summer	-	-	-	10	20	mg/l	3 x Weekly	24 Hr. Composite
Winter	-	-	-	15	30	mg/l	3 x Weekly	24 Hr. Composite

[1] The following water treatment additives in use at Outfall 002 are under review for use by the Commissioner: **Urea Dry; Granular Chloride HTH 70%; Aluminum Sulfate; Drewfloc 2448; GAC Udysorb Activated Carbon; Drewchlor 4107; Drewgard 120; Sodium Bicarbonate Powered US; Drew 6005 pH Control Additive; Drew 610 Coreactant; Carbide Lime; Amersep 5320 Coagulant; Muriatic Acid, Inhibited; Drewfloc 2270; Adjunct H Corrosion Inhibitor; Drewsperser 739; Biosperser 250; Drewplus ed-830; Drew 2305; WPD 11-166; Biosperser 255; Biosperser 282B; Sodium Hypochlorite; Rydlyme; Muriatic Acid; Drewtrol 7000;** In the event that changes are to be made in the use of water treatment additives including dosage rates, the permittee shall notify the Indiana Department of Environmental Management as required by Part II.C.1. of this permit. The use of any new or changed water treatment additives must receive prior approval from IDEM in accordance with Part II.A.5, A.8 and C.10 of this permit. Acute and chronic aquatic toxicity information must be provided.

[2] The above-noted parameter is intended to be analyzed by a test method which will measure the quantity of acid-soluble metal present, however, an approved analytical method for acid-soluble metal is not yet available. Therefore, the permittee shall measure and report this parameter as total recoverable metal until such method is approved which measures acid-soluble metal.

[3] The water quality based effluent limit (WQBEL) for Total Residual Chlorine and PCB's is less than the limit of quantitation (LOQ) as defined below. Compliance with this permit will be demonstrated if the effluent concentrations measured are less than the LOQ.

If the measured concentration of Total Residual Chlorine and PCB's is greater than the water quality based effluent limitations and above the respective LOD specified in the table below in any three (3) consecutive analyses, or any five (5) out of nine (9) analyses, then the discharger shall:

- (1) Determine the source of the parameter through an evaluation of sampling techniques, analytical/laboratory procedures, and waste streams (including internal waste streams); and evaluate PCB treatment systems and chlorination/de-chlorination procedures

<u>Parameter</u>	<u>Test Method</u>	<u>LOD</u>	<u>LOQ</u>
PCBs	608	0.1 ug/l	0.32 ug/l
Chlorine	330.1 or 330.5	0.02 mg/l	0.06 mg/l

The LOD and LOQ listed for method 608 pertain to PCB's (class), which would include any/all aroclors identified.

[4] Summer limitations apply from May 1 through November 30. Winter limitations apply from December 1 through April 30.

Pollutants of concern and their discharge limits at **Outfall 003**.

STORM WATER DISCHARGE LIMITATIONS [1] [5]

<u>Parameter</u>	<u>Quantity or Loading</u>			<u>Quality or Concentration</u>			<u>Monitoring Requirements</u>	
	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>	<u>Units</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow [3]	Report	Report	MGD	-	-	-	Daily [2]	24 Hr. Total
pH	-	-	-	6.0 to 9.0	Std Units	-	Daily [2]	Grab
Oil & Grease	-	-	-	Report	Report	-	Daily [2]	Grab
Polychlorinated Biphenyls (PCB's) [4]	-	-	-	0.0006	0.0013	ug/l	Daily [2]	24 Hr. Composite
Total Suspended Solids	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite
CBOD ₅	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite
COD	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite
Total Kjeldahl Nitrogen	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite
Nitrate plus Nitrite Nitrogen	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite
Total Phosphorus	-	-	-	Report	Report	mg/l	Daily [2]	Grab & Composite

- [1] The Permittee shall notify the Indiana Department of Environmental Management as required by Part II.C.1. of this permit if the permittee plans to use any water treatment additives. The permittee must receive prior approval from IDEM in accordance with Part II.A.5, A.8 and C.10 of this permit before it can use any water treatment additive. Acute and chronic aquatic toxicity information must be provided.
- [2] Daily measurement frequency shall mean any day the facility discharges from Outfall 003.
- [3] The permittee shall act to maintain a reserve capacity in the storm water retention lagoon greater than or equal to that sufficient to contain a 15 year, 24-hour storm event on the lagoon and contributing areas. The pumping rate or draw down rate at which the contents of the storm lagoon are continuously fed into the biological treatment system has averaged 185,000 gpd in the past. Dry weather discharge is prohibited. Discharge from Outfall 003 is permitted only when a severe storm event or combination of storm events results in an overflow of the retention lagoon despite the permittee's effort to maintain the storage capacity as noted. In the event of the overflow, the permittee shall monitor the discharge as noted above.
- [4] The water quality based effluent limit (WQBEL) for PCB's is less than the limit of quantitation (LOQ) as defined below. Compliance with this permit will be demonstrated if the effluent concentrations measured are less than the LOQ.

If the measured concentration of PCB's is greater than the water quality based effluent limitations and above the respective LOD specified in the table below in any three (3) consecutive analyses, or any five (5) out of nine (9) analyses, then the discharger shall:

- (1) Determine the source of the parameter through an evaluation of sampling techniques, analytical/laboratory procedures, and waste streams (including internal waste streams); and evaluate PCB treatment systems.

Case-Specific LOD/LOQ

The permittee may determine a case-specific LOD or LOQ using the analytical method specified above, or any other test method which is approved by the Commissioner prior to use. The LOD shall be derived by the procedure specified for method detection limits contained in 40 CFR Part 136, Appendix B, and the LOQ shall be set equal to 3.18 times the LOD. Other methods may be used if first approved by the Commissioner.

<u>Parameter</u>	<u>Test Method</u>	<u>LOD</u>	<u>LOQ</u>
PCBs	608	0.1 ug/l	0.32 ug/l

The LOD and LOQ listed for method 608 pertain to PCB's (class), which would include any/all aroclors identified.

- [5] The permittee is required to develop and implement a Storm Water Pollution Prevention Plan as described in Part I.D. of the permit.

Effluent Limitations Rationale

The process wastewater generated at this facility is covered under federally promulgated effluent guidelines (FELG): Metal Molding and Casting Source Point Category 40 CFR 464 and Subpart A - Aluminum Casting Subcategory 40 CFR 464.13 as well as 327 IAC 2 and 327 IAC 5.

- Flow

Flow is to be monitored in accordance with 327 IAC 5-2-13(a)(2).

- pH

Limitations for pH are based on 327 IAC 2-1-6(b)(2).

- Oil and Grease

The intent of this monitoring requirement is to assure that oil and grease is not added through the use of pumping devices. The limit for Oil and Grease (10 mg/l, daily maximum) is considered sufficient to ensure compliance with the narrative water quality criteria in 327 IAC 2-1-6(a) that prohibits a visible oil sheen on receiving waters.

- BOD₅, Copper, Lead, and Zinc

The previous discharge limitation limits for these pollutants are water quality based effluent limits (WQBEL's) based on a March 17, 1999 waste load allocation (WLA) and a reasonable potential to exceed (RPE) the WQBEL's as performed by IDEM's OWQ's Modeling Section. An explanation of the method used to derive water quality based permit limits is appended as Attachment III.

- Total Phenols

limits are retained from the previous permit.

- Total Residual Chlorine (TRC)

Total Residual Chlorine is included in this permit due to the fact that the facilities intake water is supplied by the Community Public Water Supply (PWS). Municipal water plant's use chlorine as a bacteriological control and disinfectant. The level of chlorine in the water supplied by a community PWS is required to be maintained at a level which exceeds the water quality standards set forth in 327 IAC 2-1-6 Table 1. Therefore, there is a reasonable potential to exceed the water quality standards in accordance with 327 IAC 5-2-11.1(h)

- Polychlorinated Biphenyls (PCB's)

The effluent limit in the existing permit was compared to Water Quality Based Effluent Limits (WQBEL) using existing water quality criteria. The Water Quality Based Effluent Limitations (WQBEL) are based upon Indiana Water Quality Standards (IWQS) in accordance with 327 IAC 2-1-6. The current WQBEL for PCB's is more stringent than the previous limit and will therefore be incorporated in this renewal permit.

When the water quality based effluent limitation for any substance is less than the limit of quantitation normally achievable and determined by the commissioner to be appropriate for that substance in the effluent, the permit shall contain the provisions in accordance with 327 IAC 5-2-11.1(f).

- Ammonia as (N), and Total Suspended Solids (TSS)

The discharge limitation limits for these pollutants are water quality based effluent limits (WQBEL's) and are more stringent than the waste load allocation (WLA) and reasonable potential to exceed (RPE) the WQBEL's performed by IDEM's OWQ's Modeling Section on November 7, 2001. Therefore, the previous permits limitations are to be retained in accordance with the antibacksliding requirements of 327 IAC 5-2-10(11).

Permit Compliance History

A review of the 1997 - 2002 Discharge Monitoring Reports (DMR's) indicates violations of their discharge limits for Ammonia-Nitrogen in March, 1997, March, 1999, February 2001 and April 2001; BOD₅ in September 1997 and October 1997; Total Copper May 2002, and July 2002; Total Phenolics March 2002

A Notice of Violation (NOV) was issued October 16th 2002 by the IDEM Office of Enforcement for Ammonia-Nitrogen, Total Phenolics, and Copper. IDEM is negotiating a resolution for these violations through an Agreed Order.

Monitoring Requirements

Based on a review of the permittee's Permit Application, it was determined that the Measurement Frequency for PCB's should be 1 x Weekly when corrective action wastes streams are routed through the wastewater treatment system as opposed to 1 x Monthly when the facility is sending a PCB corrective action waste stream through its wastewater treatment plant.

Prepared by Joe Gwinn

Attachment I

Attachment II

Attachment III

Permit Limit Derivation Method

The procedures below were adapted from procedures given in the Technical Support Document for Water Quality-Based Toxics Control, EPA 505/2-90-001, and in the Permit Writers Guide to Water Quality-Based Permitting for Toxic Pollutants, EPA 440/4-87-005. The EPA procedures assume that treated effluent data follows a log-normal distribution. If a discharger can demonstrate that the treated effluent data does not follow a log-normal distribution for a substance, and can provide an alternate distribution which more accurately describes the effluent, this alternate procedure may be used to develop effluent limitations.

There are two basic parts to this process. The first is to calculate a toxics wasteload allocation (WLA) for the facility using Indiana Water Quality Standards. The values which result from this calculation are WLA's in four-day average or "chronic" and maximum or "acute" forms. The chronic and acute WLA's are then converted into Long Term Averages (LTA's) by using the log-normal distribution formula. The more restrictive LTA will then be converted to daily maximum and monthly average limits again using the log-normal distribution formula.

Step 1 - Steady-State WLA Derivation Procedure

$$WLA = \frac{WQC(Q_s + Q_e) - Q_s C_u}{Q_e}$$

WLA = Wasteload Allocation. Allowable 4-day average or maximum concentration of a pollutant in the effluent.

Q_s = Receiving water design flow as specified below:

- 0 -Final Acute Value (2 * AAC)
- 1/2 $Q_{7,10}$ -Chronic Aquatic Criteria (CAC)
- 1/2 $Q_{7,10}$ -Human Life Cycle Safe Concentration (HLSC)
- 1/4 Q_{50} -Cancer Risk Criteria (CRC)
- $Q_{7,10}$ (at DWI) -HLSC (Drinking Water Protection)
- Q_{50} (at DWI) -CRC (Drinking Water Protection)

Q_e = Effluent flow. For public and semi-public facilities this is the design flow of the wastewater treatment plant. For industries a design flow is calculated using the highest recorded monthly average flow taken from the most recent two year period of flow data.

WQC = The water quality criterion. The criterion used to protect against chronic effects is taken directly from 327 IAC 2-1, Table 1, if available. If a criterion is not contained in Table 1, a criterion may be calculated using the procedures contained under 327 IAC 2-1-8.1 through 2-1-8.7. The criterion used to protect against acute toxicity is two times the Acute Aquatic Criterion (AAC) contained in Table 1, which is equivalent to the Final Acute Value (FAV). If a hardness value is needed to calculate this criterion, the 50th percentile value taken downstream of the discharge should be used. If this data is not available, a hardness value from a similar nearby stream may be used.

C_u = The upstream background concentration of a substance determined by obtaining the 50th percentile concentration of the parameter upstream of the discharge. If upstream data is not available, ambient data from similar nearby streams may be used. If the calculated 50th percentile value is at or below the reported detection level, the upstream concentration (C_u) should be taken as:

$$C_u = \frac{(100 - P)(X)}{50}$$

where:

X = the detection level used

P = percentage of background upstream concentration values reported present at or below the detection level

Step 2 - Statistical Limit Derivation

Once the WLA target is set, the permit limit derivation process begins. This calculation is performed independently of water quality considerations. The remaining procedures seek a level of treatment (governed by permit limits) which is designed to protect against both acute and chronic instream effects. All remaining calculations are designed to define treatment performance (i.e., effluent quality targets), not an ambient water quality target.

1. Calculate the long term average (LTA) that will meet the above WLA.
 - a. The LTA for the maximum or "acute" WLA is calculated as follows:

$$LTA = e[\mu + 0.5(\sigma^2)]$$

where:

$$\mu = \ln(\text{acute WLA}) - Z1(\sigma)$$

$Z1 = Z(99) = 2.326$ = The Z score for the probability basis for the WLA value (i.e. the chronic WLA will be met 99% of the time if the LTA is met).

$$\sigma^2 = \ln(CV^2 + 1)$$

CV = Coefficient of Variation = std. dev./average (0.6 unless historical data is available).

- b. The LTA for the four-day average or "chronic" WLA is calculated as follows:

$$LTA = e^{[\mu + 0.5(\sigma^2)]}$$

where:

$$\mu = \mu(4) - 0.5(\sigma^2) + 0.5[\ln(1 + [(\sigma^2 - 1)/(4)])]$$

$$\mu(4) = \ln(\text{chronic WLA}) - Z1[\ln(1 + [(\sigma^2 - 1)/(4)])]^{1/2}$$

2. Select the lower LTA. Of the two WLA specifications, the one with the lower LTA is more limiting for the plant in question. This LTA will drive the required treatment to meet the permit limits. Two permit limits will be derived in the next step from the more limiting of the acute or chronic LTA.
3. Using the equations below and the LTA and CV selected, the Daily Maximum and Monthly Average permit limits are calculated. The 95th percentile is generally used for the Monthly Average limits while the 99th percentile is used to determine the Daily Maximum limits. The Monthly Average permit limit is dependent on the monitoring frequency (where n = required frequency in samples per month). The Technical Support Document recommends not to use a value for n of less than 10 regardless of the actual sampling frequency.

- a. Calculate the Daily Maximum permit limit:

$$\text{Daily Maximum} = e^{[\mu + Z3(\sigma)]}$$

where:

$Z3 = Z(99) = 2.326$ = The Z score for the probability basis for the permit limits (i.e., the maximum permit limit will be met 99% of the time if the LTA is met).

$$\mu = \ln(LTA) - 0.5(\sigma^2)$$

$$\sigma^2 = 1n(CV^2 + 1)$$

- b. Calculate the Monthly Average permit limit (μ described above):

$$\text{Monthly Average} = \mu(n) + Z2[\sigma(n)]$$

where:

$Z2 - Z(95) = 1.645 =$ The Z score for the probability basis for the permit limits
(i.e., the average permit limit will be met 95% of the time if
the LTA is met).

$$\mu(n) = \mu + (\sigma^2 - \sigma(n)^2)/2$$

$$\sigma(n)^2 = 1n(1 + [(\sigma^2 - 1)/n])$$

n = number of effluent sampling observations per month.